



Weekly Water and Climate Update

December 18, 2014

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Agricultural Weather Highlights – Thursday – December 18, 2014

- “In the **West**, mild weather across the northern half of the region contrast with cool conditions farther south. Widely scattered rain and snow showers dot the region. Despite recent snowfall in the Sierra Nevada, the average water content of the high-elevation snowpack remains less than half of the mid-December normal.
- On the **Plains**, light snow—which is helping to provide moisture and insulation for winter wheat—is gradually ending across eastern sections of Kansas and Nebraska. In Kansas, current snow depths include 3 inches in Wichita and Junction City. In contrast, mild weather is returning to the northern High Plains.
- In the **Corn Belt**, light snow is spreading into the middle Mississippi Valley, causing generally minor travel disruptions. By daybreak, Kansas City, Missouri, reported a 2-inch snow depth. Elsewhere, Midwestern agricultural concerns include final corn harvest efforts in the Great Lakes region and the health of late-planted winter wheat across the southern and eastern Corn Belt.
- In the **South**, scattered rain showers stretch from the southern Appalachians to the Texas coast. In areas where recent rain has been lacking, including the central Gulf Coast region, the showers are boosting topsoil moisture.

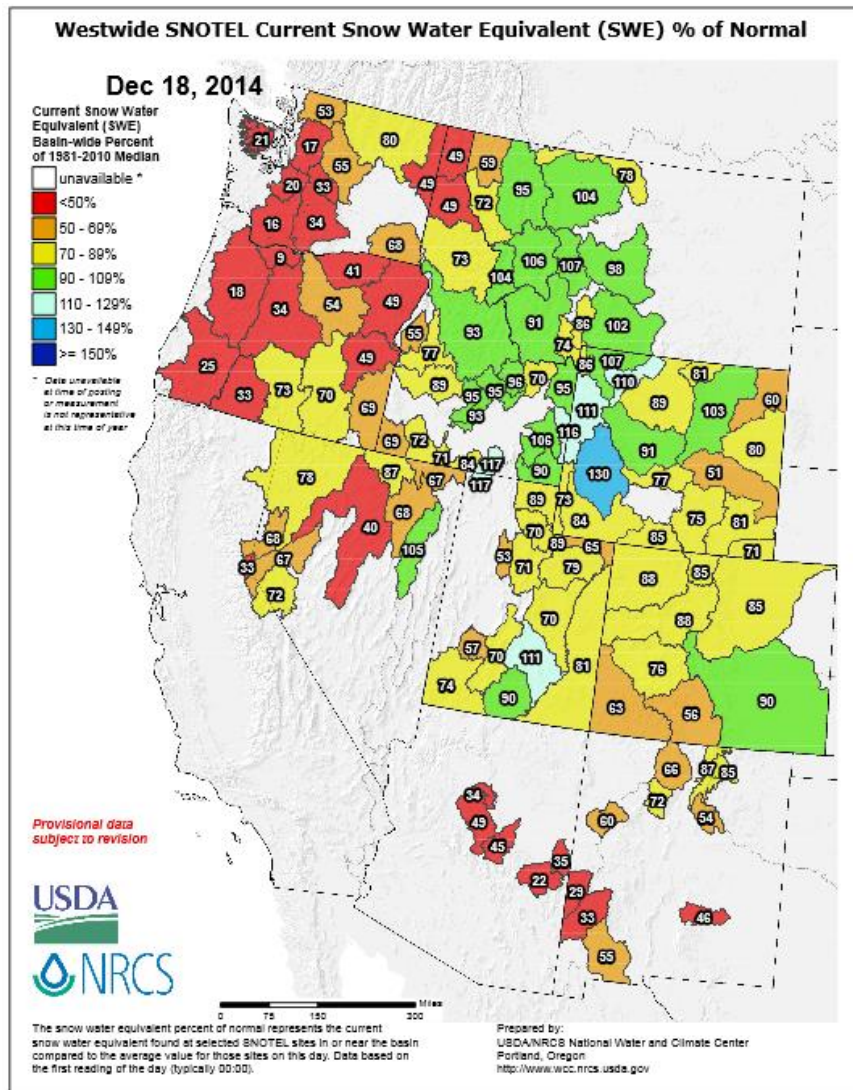
Outlook: A series of weak disturbances will result in unsettled weather across the eastern half of the U.S. During the next 5 days, precipitation totals will be mostly light—less than one-half inch, for example, in the Midwest — although some heavier rain (locally 1 to 3 inches) will fall in the western and central Gulf Coast regions. Meanwhile, a final push of moisture will spread across northern and central California on Friday. Thereafter, the focus for precipitation will shift to the Pacific Northwest, just clipping northwestern California. Five-day precipitation totals could reach 4 to 10 inches in the Pacific Northwest and 2 to 4 inches in the northern Rockies. Elsewhere, unusually mild weather will dominate the U.S. during the next several days, particularly during the weekend and early next week. The NWS 6- to 10-day outlook for December 23-27 calls for a return to near- or below-normal temperatures in most areas east of the Rockies, while warmer-than-normal weather will be confined to the West and Northeast. Meanwhile, above-normal precipitation across the northern and eastern U.S. will contrast with drier-than-normal conditions from California to the lower Mississippi Valley.”

Contact: Brad Rippey, Agricultural Meteorologist, USDA/OCE/WAOB, Washington, D.C. (202-720-2397)

Website: <http://www.usda.gov/oce/weather/pubs/Daily/TODAYSWX.pdf>

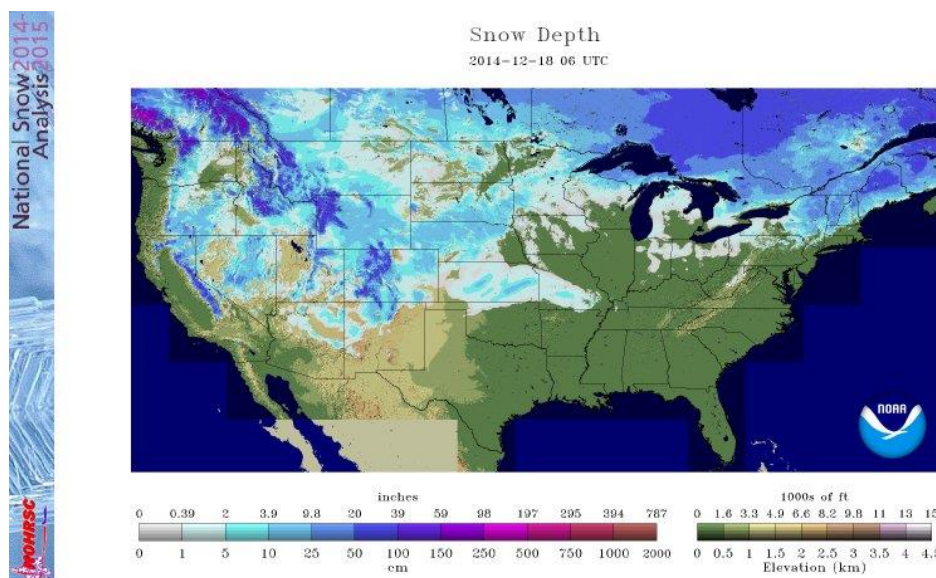
The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment

Snow



For the [2015 Water Year](#) that began on October 1, 2014, only a few basins in Wyoming, and one each in eastern Idaho and southern Utah have recorded much above normal Snow Water Equivalent (SWE) values (medium blue and dark blue areas) at this time.

The largest snowpack deficits (red areas) are in the Cascades and Olympics of Oregon and Washington, the northern Rockies in Idaho and Washington, the Blue Mountains in eastern Oregon, and the mountainous regions in Arizona and southern New Mexico.



Snow depth map of the U.S. as reported from [NWS NOHRSC](#) for December 18, 2014. Snow is reported across much of the mountains in the West, the upper Midwest, much of the central and northern Plains, and the Northeast. Areas with a substantial snowpack include the Upper Peninsula of Michigan, the Rocky Mountains in Wyoming, Montana, and central Idaho, as well as the North Cascades in Washington, and in northern Maine.

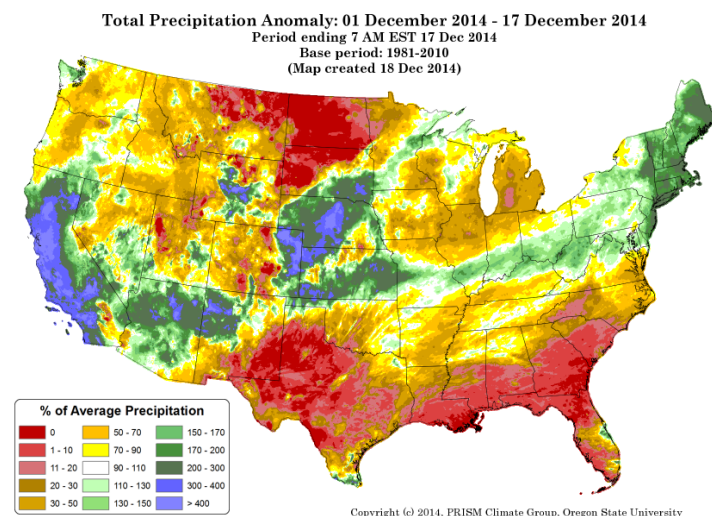
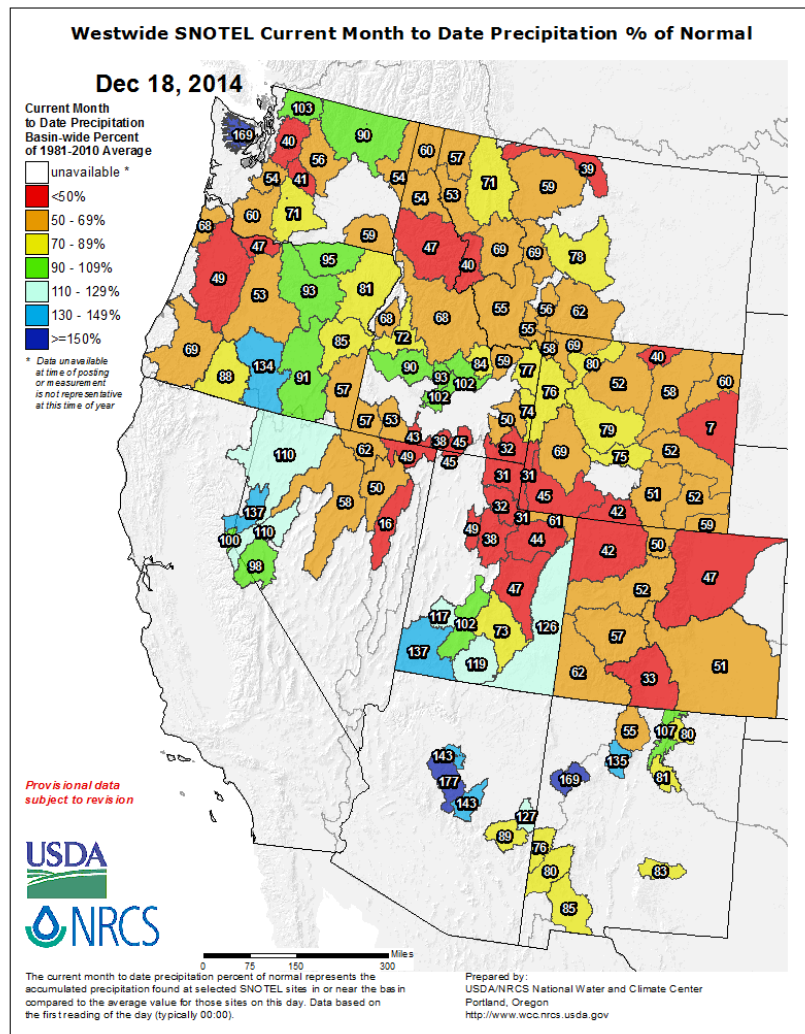
Weekly Water and Climate Update

Precipitation

In the West, the [SNOTEL](#) precipitation percent of normal map shows basins in southern Utah, Arizona, New Mexico, Wyoming, western Nevada, and southern Oregon are above normal so far this month. Below normal precipitation is widespread in basins in western Oregon, Washington, northern and southern Idaho, northern Utah, eastern Nevada, Montana, Colorado, and Wyoming.

The percent of normal values (especially the dark blue areas) may be amplified where normally very little precipitation falls during this time of year.

Click on most maps in this report to enlarge and see the latest available update.



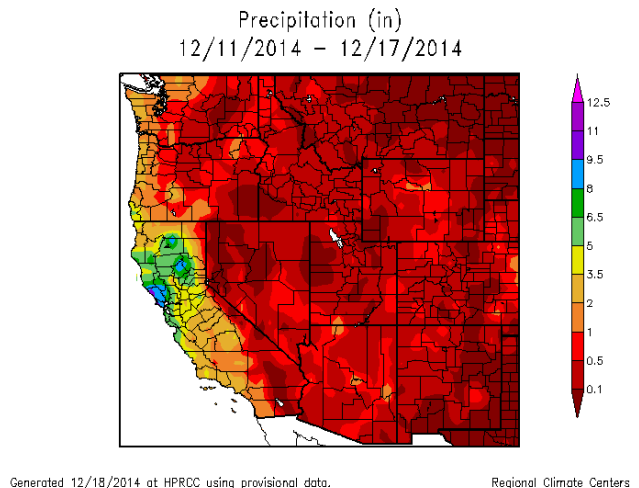
Thus far in December 2014, the national [precipitation anomaly](#) pattern reveals some higher than normal precipitation, primarily in California, Nevada, Arizona, New Mexico, eastern Colorado, central Wyoming, Nebraska, and Kansas. The New England states also received above normal precipitation. There was little or no precipitation in North Dakota, parts of South Dakota, eastern Montana, and along the South in Texas, Louisiana, Mississippi, Alabama, northern Florida, Georgia, and South Carolina (red areas).

This preliminary daily PRISM precipitation anomaly map contains all available network data, including SNOTEL data, and is updated periodically as additional data become available and are quality controlled.

Weekly Water and Climate Update

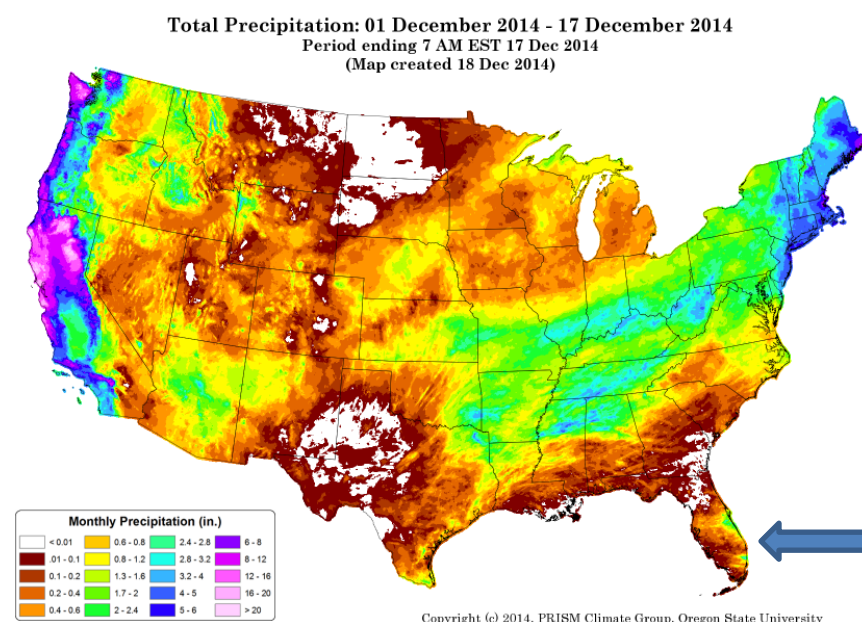
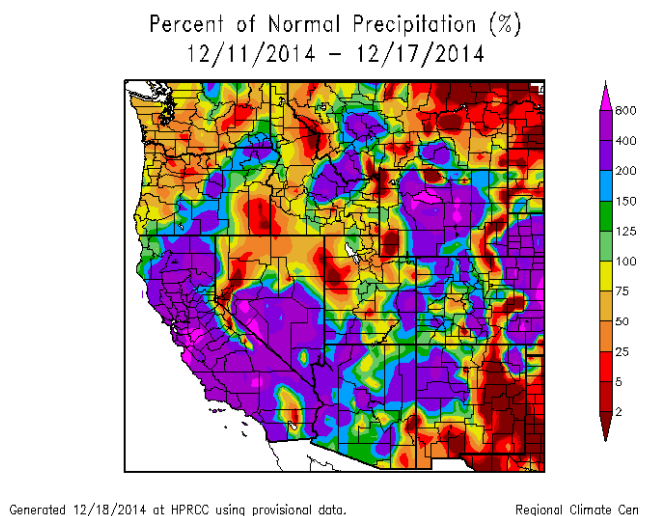
The [ACIS 7-day](#) total precipitation map for the western U.S. shows mainly dry conditions. Precipitation has fallen in California, Nevada, western Oregon, and Washington. The central California coast received the highest precipitation for the week at over 9.5 inches.

There was scattered precipitation across the West in most states. The areas that received noted precipitation were in central Wyoming, parts of Arizona, southern Utah, eastern Colorado and northeast Oregon.



This percent of normal [map](#) of the West for the last seven days reflects heavy precipitation scattered across the region. The heaviest percent of normal precipitation fell in California, Nevada, Wyoming, and western Colorado which recorded over 800% for the period (pink area). All the western states also had widespread areas of precipitation that were over 200% of normal (purple areas).

Percent of normal precipitation may be exaggerated in areas where the average for this period is at or near zero.



For December 2014, the [total precipitation](#) across the continental U.S. was heaviest along the west coast of Washington, Oregon, and California. Isolated high precipitation was also recorded in Tennessee, Kentucky, New Jersey, Delaware, West Virginia, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, southeast New York, northern Mississippi, and Alabama. In contrast, much of the central U.S., and Texas were mainly dry.

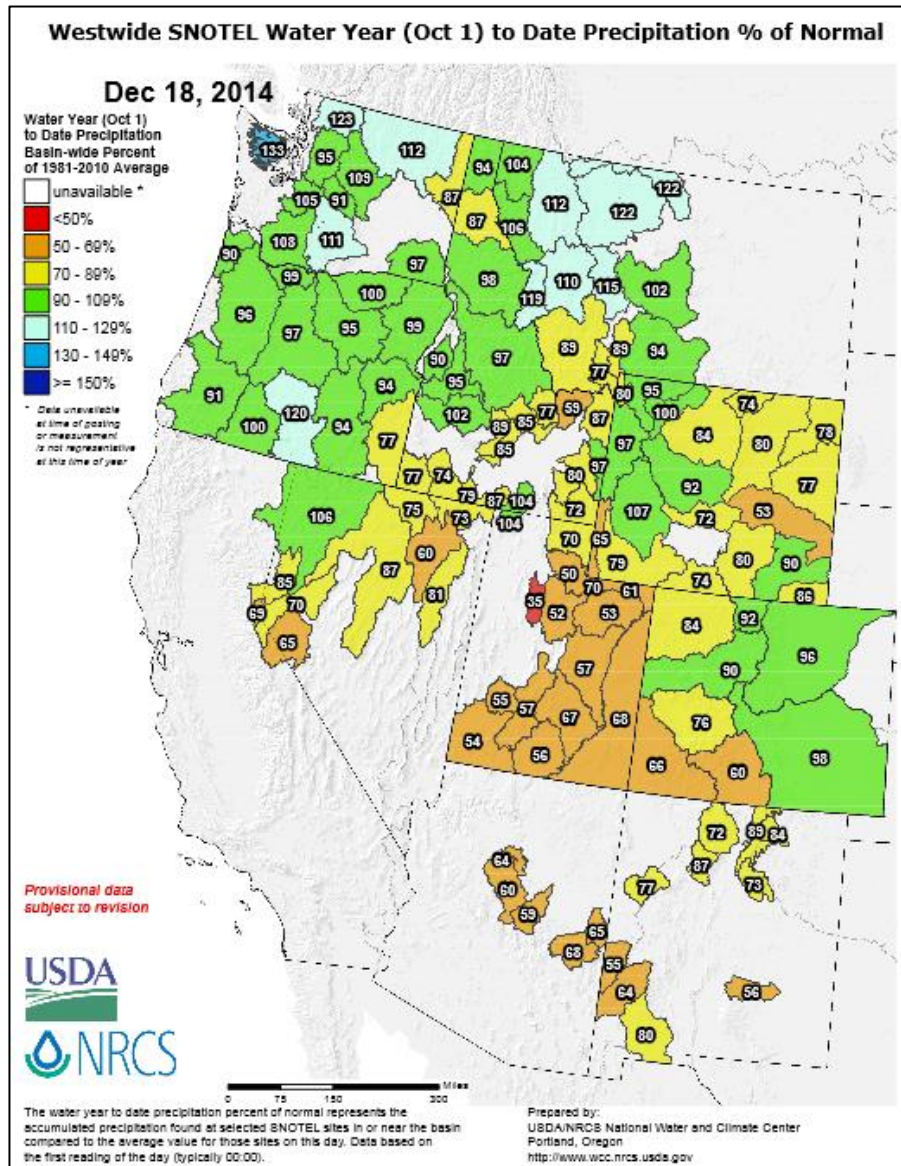
See [Go Hydrology](#) for current and forecast conditions over southern Florida.

Weekly Water and Climate Update

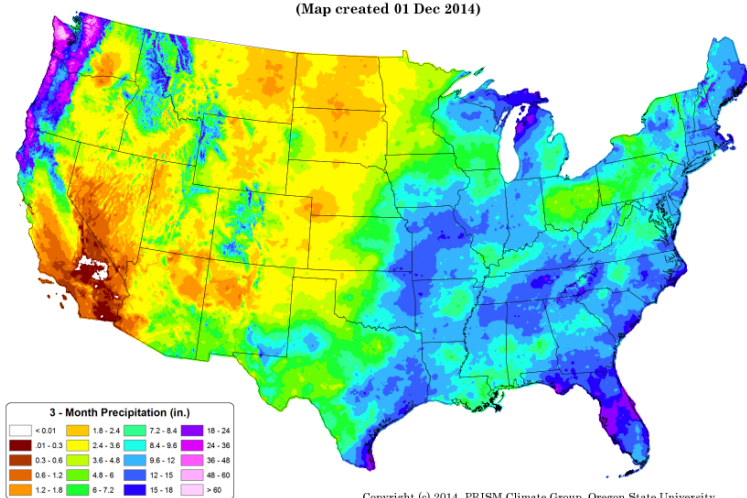
For the [2015 Water Year](#) that began on October 1, 2014, precipitation surpluses have occurred in a few basins in Washington and Montana.

Many basins across the West have near normal conditions for this part of the Water Year (mapped in green). A few areas have less than normal precipitation for the Water Year. These include basins in every state in the West.

At the beginning of the Water Year, basin conditions can change rapidly with small amounts of precipitation. As the Water Year advances, it becomes more difficult for river basins to change bin categories.



Total Precipitation: September 2014 - November 2014
Period ending 7 AM EST 30 Nov 2014
(Map created 01 Dec 2014)



The national map of the [three-month period](#) (September - November) shows that the eastern half of the nation received precipitation in the range from 6 inches to greater than 18 inches. The highest amounts were recorded in Michigan, Florida, New Hampshire, Maine, and southern Texas. In the West, Oregon, Washington, and northern California received over 36 inches for the period.

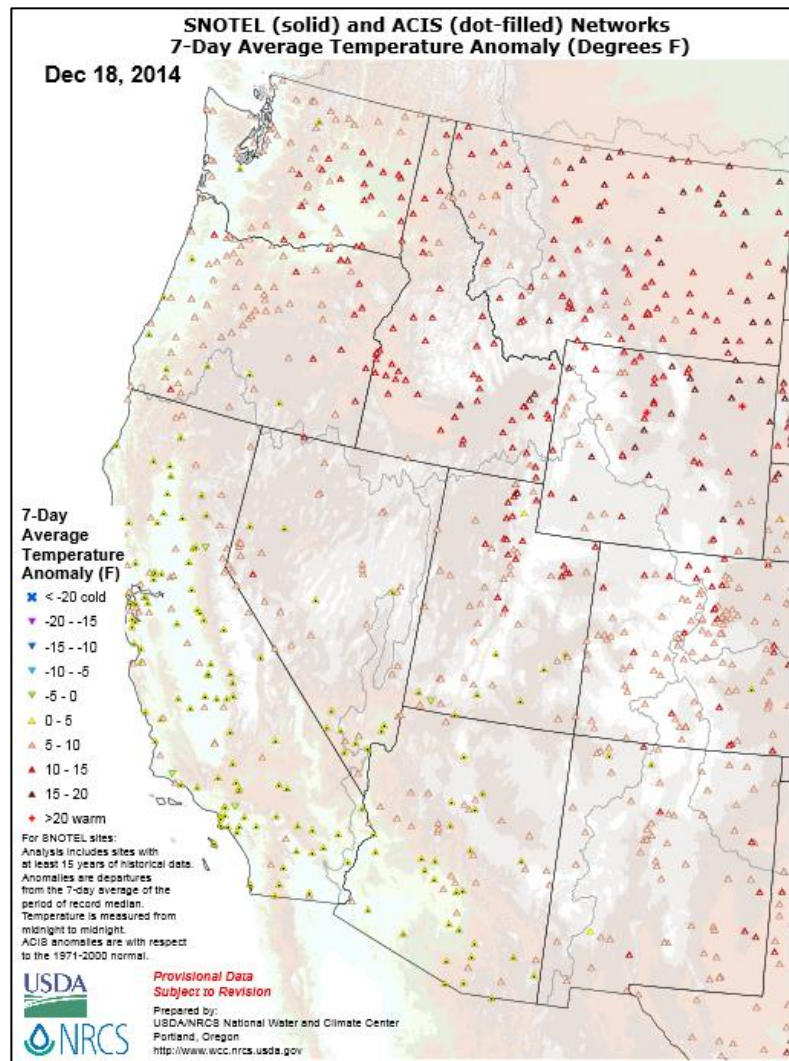
In contrast, parts of the West received totals of less than 1.8 inches. Central and southern California had little to no precipitation for the period.

Weekly Water and Climate Update

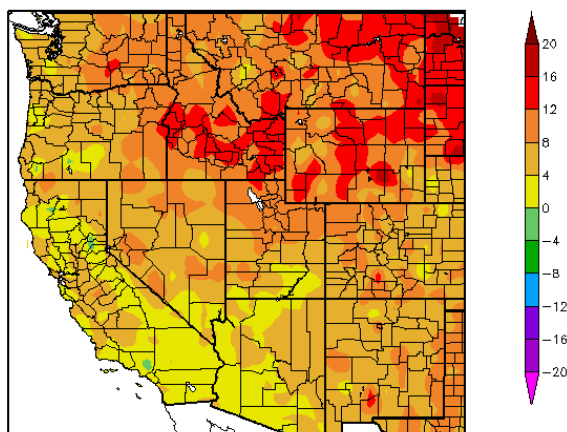
Temperature

The SNOTEL and ACIS [7-day temperature anomaly](#) map for the western U.S. shows most of the West was warmer than normal for the week. This is due to the warm storm track this past week affecting the region. The highest anomalies occurred in Oregon, Idaho, Montana, Wyoming, Colorado, Utah, Nevada, California, Arizona, and New Mexico.

There were only a few stations across the entire West that reported below average temperatures for the week.



Departure from Normal Temperature (F)
12/11/2014 – 12/17/2014



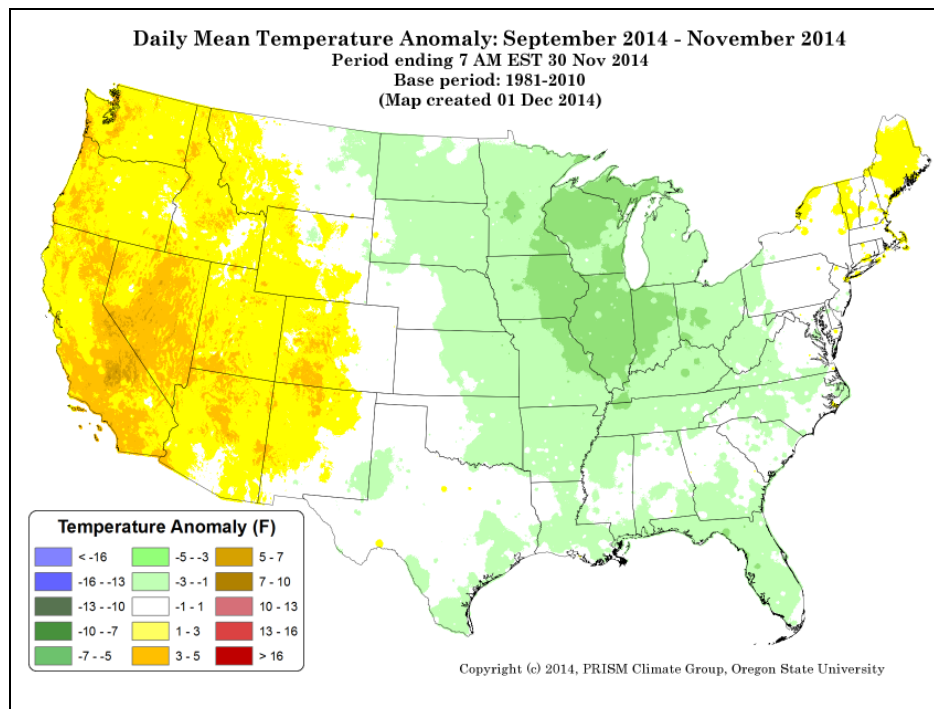
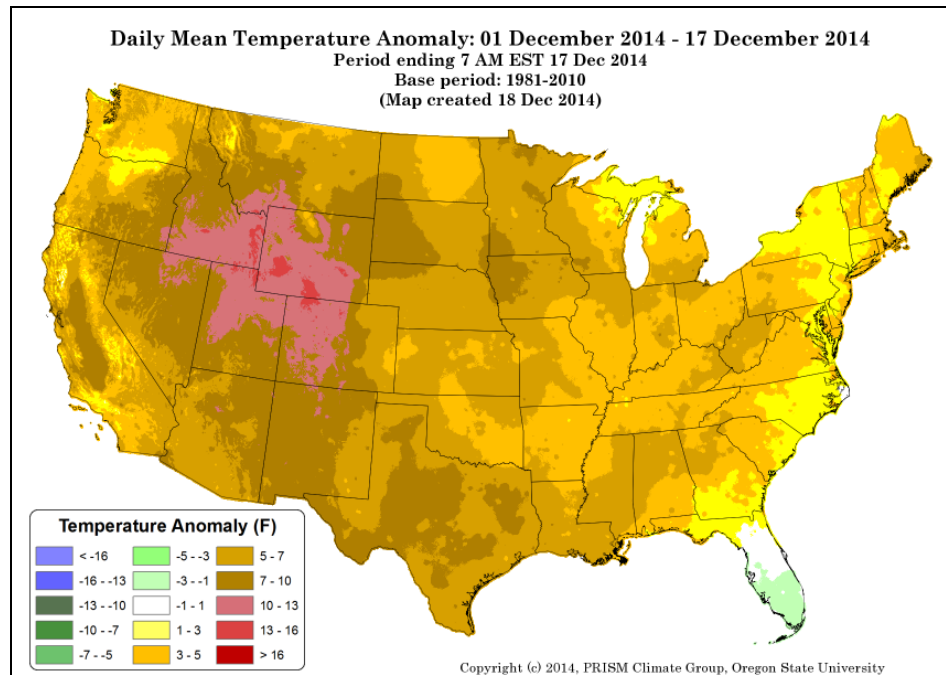
The [ACIS](#) map of the 7-day average temperature anomalies in the West ending December 17 shows that there were no negative temperature departures in the West. The greatest positive temperature departures occurred in Montana, Wyoming, and Idaho (>+12°F). Almost the entire West was generally warmer than normal for the week.

Also, see [Dashboard](#) and the [Westwide Drought Tracker](#)

Weekly Water and Climate Update

This preliminary [PRISM](#) temperature map contains all available network data, including SNOTEL data, and will be updated periodically as additional data become available and are quality controlled.

Thus far in December 2014, the national daily mean temperature anomaly [map](#) shows a very small cool pattern in southern Florida. ($<-3^{\circ}\text{F}$). Above normal temperatures were recorded in the rest of the U.S, with the warmest areas in Utah, Idaho, Wyoming, and Colorado ($>+13^{\circ}\text{F}$).



The September – November national daily mean temperature anomalies for the U.S. in this [climate map](#) shows the west coast had slightly to above normal temperatures in California ($>+7^{\circ}\text{F}$). The north central portion of the country reported normal to slightly cooler than normal temperatures for this period, with the coolest temperatures in northern Michigan, Wisconsin, Minnesota, Iowa, Illinois, Indiana, and a few other scattered areas ($<-3^{\circ}\text{F}$).

Weekly Water and Climate Update

Weather and Drought Summary

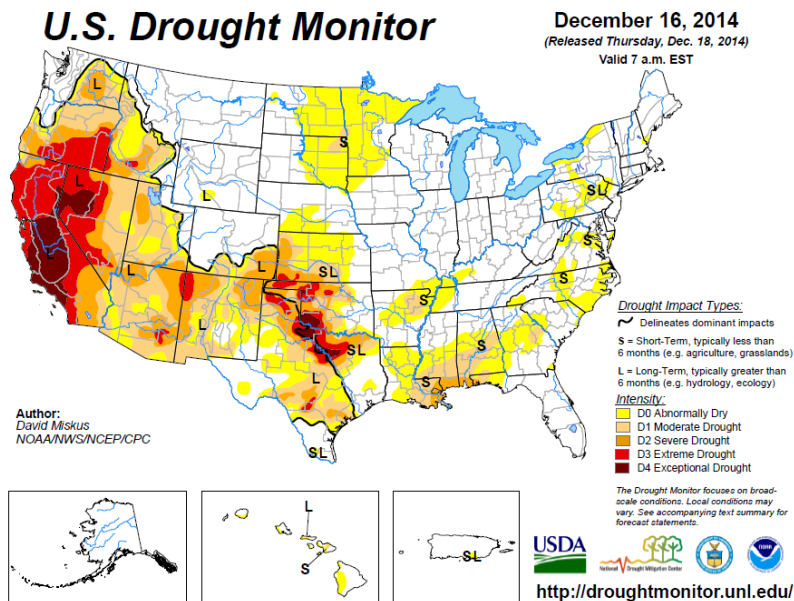
National Drought Summary – December 16, 2014

The following **Weather and Drought Summary** is provided by this week's NDMC Drought Author, David Miskus, NOAA/NWS/NCEP/CPC.

USDM Map Services: contains [archived maps](#)

"For the contiguous 48 states, the U.S. Drought Monitor showed 30.05 percent of the area in moderate drought or worse, compared with 29.84 percent a week earlier. Drought now affects 69,101,899 people, compared with 68,771,953 a week earlier.

For all 50 U.S. states and Puerto Rico, the U.S. Drought Monitor showed 25.11 percent of the area in moderate drought or worse, compared with 24.93 percent a week earlier. Drought now affects 69,125,452 people, compared with 68,795,505 a week earlier. "



See: Latest Drought [Impacts](#) during the past week.

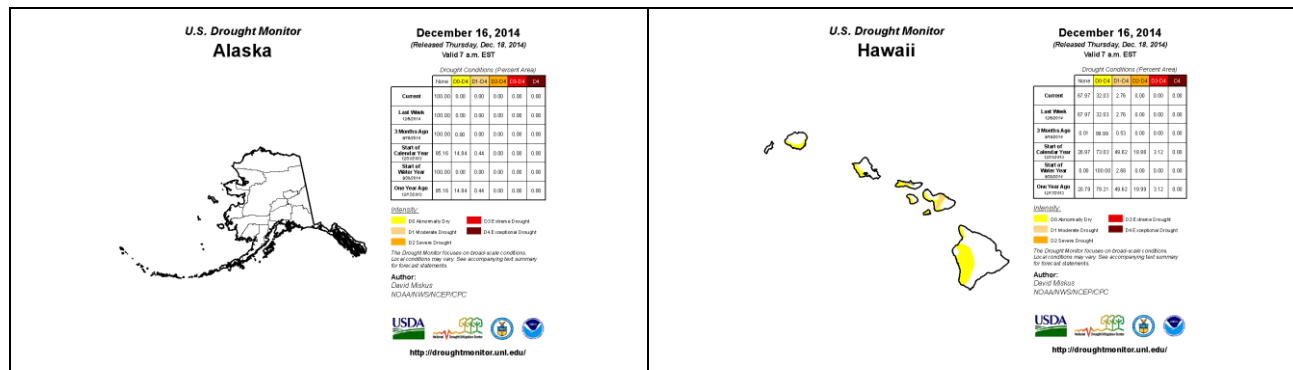
[Current Drought Monitor](#) weekly summary. The exceptional D4 levels of drought are scattered across CA, NV, TX, and OK.

The latest [drought indicator blend and component percentiles](#) spreadsheet is a great resource for climate division drought statistics. This link is for the latest [Drought Outlook](#) (forecast). See [climatological rankings](#).

For more drought news, see [Drought Impact Reporter](#).
New: [ENSO Blog](#).

Drought Management Resources:

- ✓ <http://www.usda.gov/oce/weath/Drought/AgInDrought.pdf>
- ✓ [Watch AgDay TV](#)
- ✓ [Drought Impacts Webinar Series](#)
- ✓ [NIDIS Quarterly Climate Impacts and Outlook](#)
- ✓ [The Spring 2014 edition of DroughtScope](#)
- ✓ [U.S.Crops in Drought](#)



"The [49th](#) and [50th](#) States show normal to moderate drought conditions. No changes were noted for Alaska or Hawaii this week. A comprehensive narrative describing drought conditions across other parts of the nation can be found toward the end of this document. For drought impacts definitions for the figures that follow, click [here](#)."

Weekly Water and Climate Update

U.S. Drought Monitor West

December 16, 2014

(Released Thursday, Dec. 18, 2014)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.51	65.49	54.85	33.90	18.75	5.40
Last Week 12/9/2014	34.32	65.68	55.16	34.01	18.98	8.45
3 Months Ago 9/16/2014	29.74	70.26	57.24	38.69	19.88	8.90
Start of Calendar Year 12/01/2013	22.20	77.80	51.44	31.11	7.75	0.63
Start of Water Year 9/30/2014	31.48	68.52	55.57	35.65	19.95	8.90
One Year Ago 12/17/2013	22.53	77.47	51.20	30.61	7.56	0.63

Intensity:

 D0 Abnormally Dry	 D3 Extreme Drought
 D1 Moderate Drought	 D4 Exceptional Drought
 D2 Severe Drought	

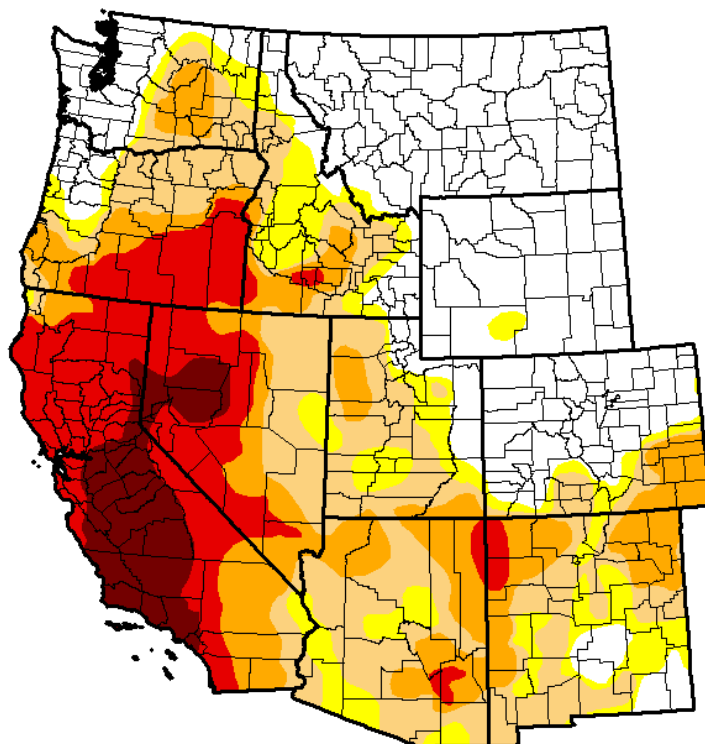
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

David Miskus
NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>



There was a decrease in all drought categories in the West this week.

[Click to enlarge maps](#)

Risk Management Web Resources

Drought Monitor for the [Western States](#). Drought Impact Reporter for [New Mexico](#), [California Data Exchange Center](#) & [Flood Management Intermountain West Climate Dashboard](#)
[California Sierra Nevada-related snow pack](#)

U.S. [Impacts](#) during the past week:

OR - [Water worries multiply in Eastern Oregon](#) – Dec 11

CO - [With future uncertain, Colorado shields its water](#) – Dec 9

U.S. - [Why you're paying more for beef, pork and chicken](#) – Dec 10

Other interesting info:

World: [Early warning signals of abrupt climate change](#) – Dec 8

AZ - [Rare Weather Event Fills Grand Canyon With Fog](#) – Dec 11

Weekly Water and Climate Update

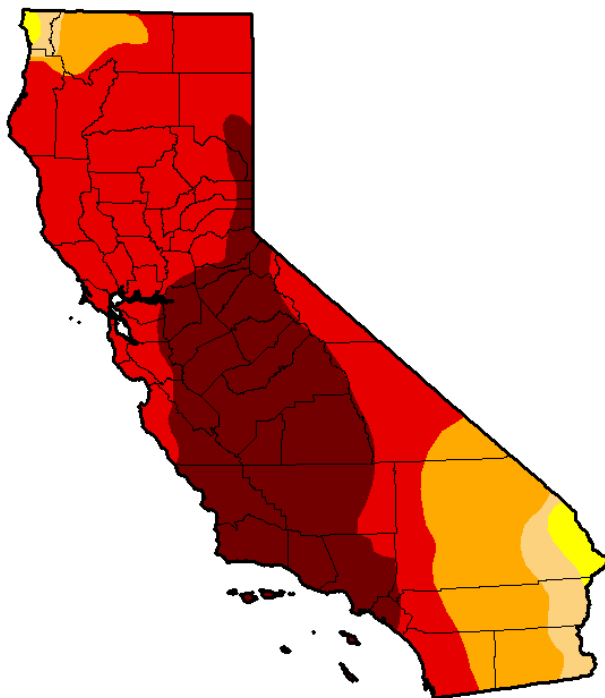
State with D-4 Exceptional Drought

U.S. Drought Monitor California

December 16, 2014

(Released Thursday, Dec. 18, 2014)

Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	98.41	94.42	77.94	32.21
Last Week 12/8/2014	0.00	100.00	99.72	94.42	79.69	55.08
3 Months Ago 9/16/2014	0.00	100.00	100.00	95.42	81.92	58.41
Start of Calendar Year 12/31/2013	2.61	97.39	94.25	87.53	27.59	0.00
Start of Water Year 9/30/2014	0.00	100.00	100.00	95.04	81.92	58.41
One Year Ago 12/17/2013	2.61	97.39	94.25	82.53	27.59	0.00

Intensity:

D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought
D2 Severe Drought	

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

David Miskus

NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>

There was a decrease in the D1, D3, and D4 drought categories in California this past week.

[CA Drought Information Resources](#)

[Drought News from California:](#)

[Almond growers say industry adds \\$11 billion to California economy](#) – Dec 9

[Despite drought, California exports on track for record year](#) – Dec 8

[Causes of Calif. drought natural, not man-made: NOAA](#) – Dec 8

[Animal deaths spike on Sierra roads as drought hits habitat](#) – Dec 8

[House approves California drought bill that faces Obama veto](#) – Dec 9

[Water board adds \\$40 million to conservation budget as drought persists](#) – Dec 9

[As The Wells Run Dry, Central Valley Neighbors Find Common Ground](#) – Dec 11

[California drought: Winter storms finally starting to boost storage levels in key reservoirs](#) – Dec 11

[Drought: East Bay poised for higher water rates](#) – Dec 9

[Geophysicist maps saltwater threat to California aquifers](#) – Dec 8

[Wet weather allows Santa Cruz to end water rationing](#) – Dec 9

Weekly Water and Climate Update

Related Area News:

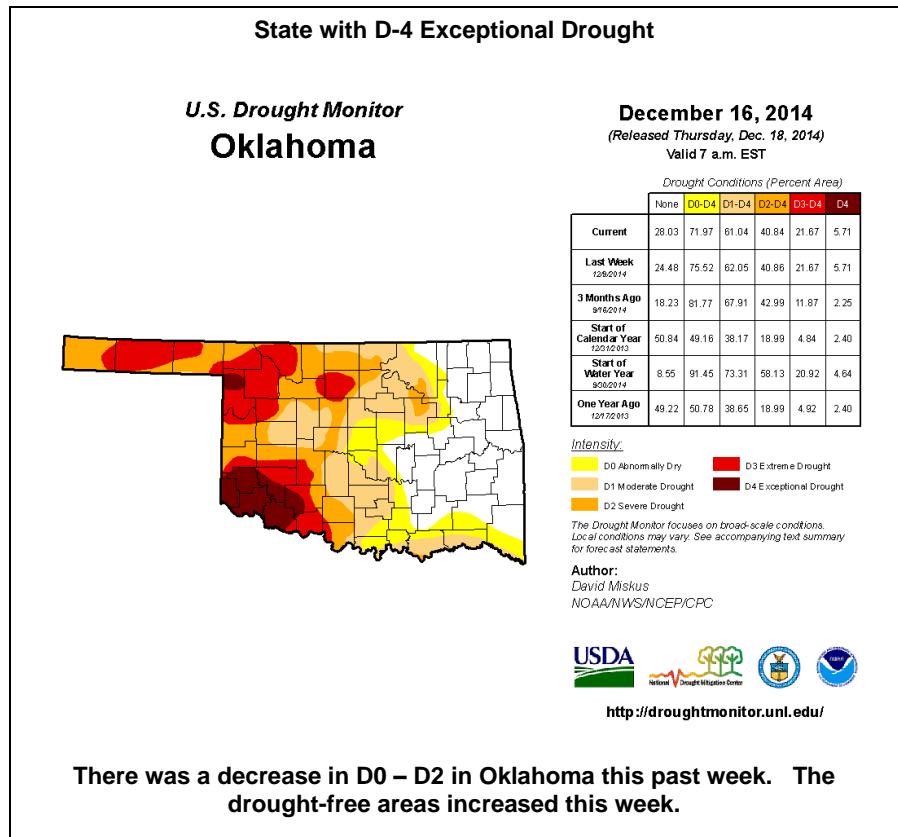
[2014 Kansas Drought Report and Summary](#)

- [Past 30 days precipitation totals](#)
- [Past 30 days precipitation percent of normal](#)
- [Calendar Year precipitation totals](#)
- [Calendar Year Precip percent of normal](#)
- [Short Crop ET](#)

Oklahoma Drought News:

[Front brings rain to the state, but leaves southwest Oklahoma dry](#) – Dec 5

[Monitor: Drought affects 1.4M Oklahomans](#) – Dec 14



U.S. Population in Drought

Number of people in each drought category in the U.S. for the week ending November 4, 2014

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2014-12-16	196,117,439	109,280,016	69,101,899	51,537,668	40,026,772	20,289,059
2014-12-09	194,853,407	110,544,048	68,771,953	50,076,405	41,101,514	29,445,231

Population figures affected by drought in the U.S. Drought Monitor website show that for this week, more than 69,000,000 people in the United States were in a drought-affected area, which increased by over 329,900 people from last week.

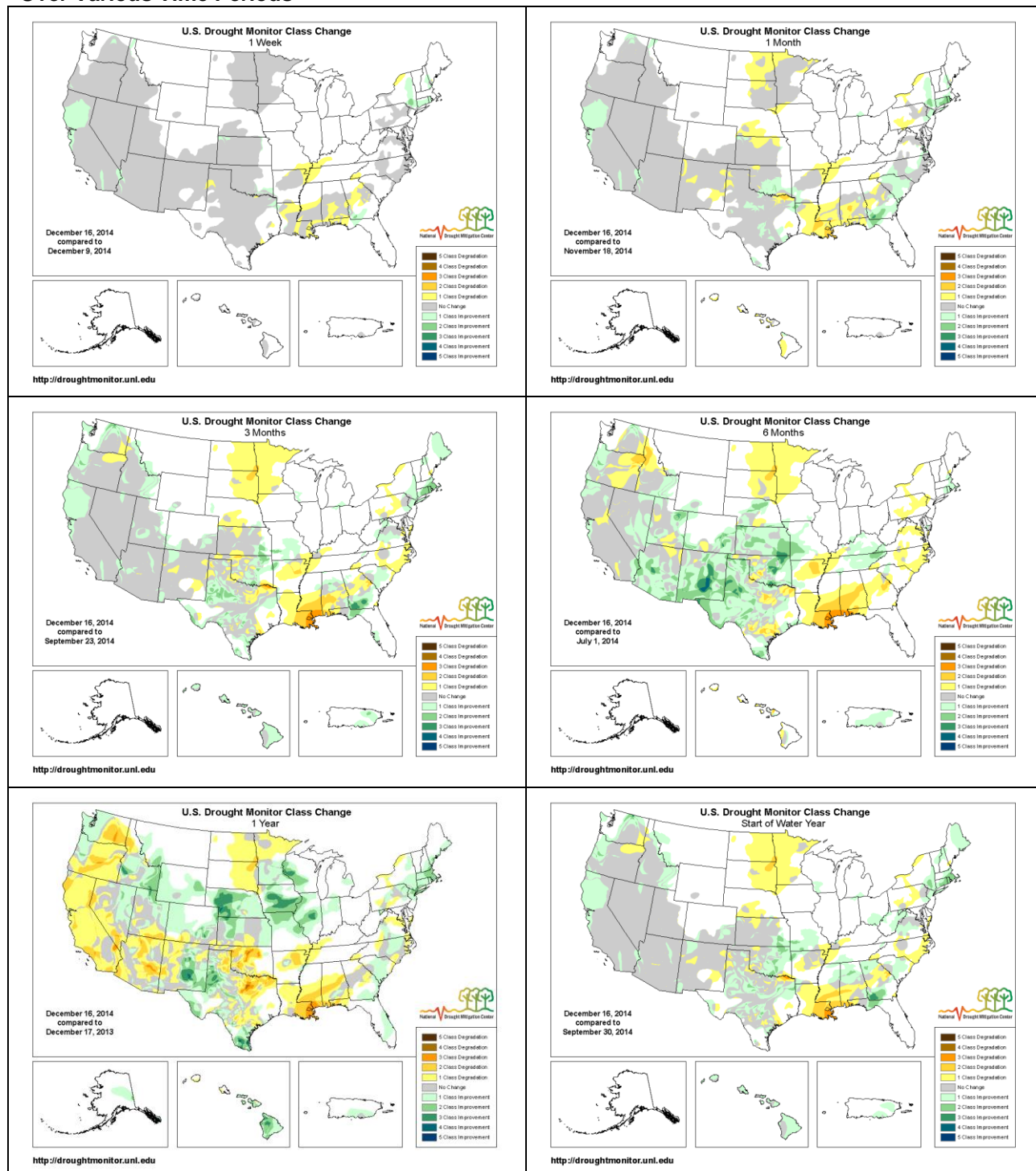
Population Statistics Methodology:

The U.S. Drought Monitor population statistics are calculated at the county level, and aggregated to the state, regional, and national levels. The population densities have been calculated for each county. The proportion of the physical area of the county that is in drought is multiplied by the uniform population density in order to obtain a number for each county. The county values are then summed at the state, regional, and national level.

Weekly Water and Climate Update

Changes in Drought Monitor Categories

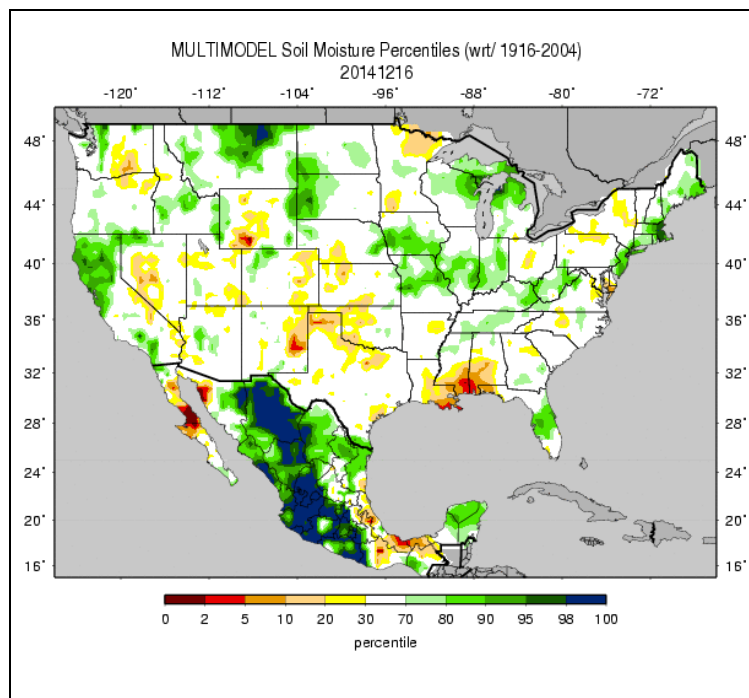
Over Various Time Periods



Click on any of these maps to enlarge. Note how the conditions over the Rockies and central Great Plains have improved between 6 to 12 months (middle right to lower left maps). However, also note that since a year ago, conditions over parts of the Northeast, the South, parts of the southern Great Plains, and the Pacific coast states have deteriorated significantly (lower left map).

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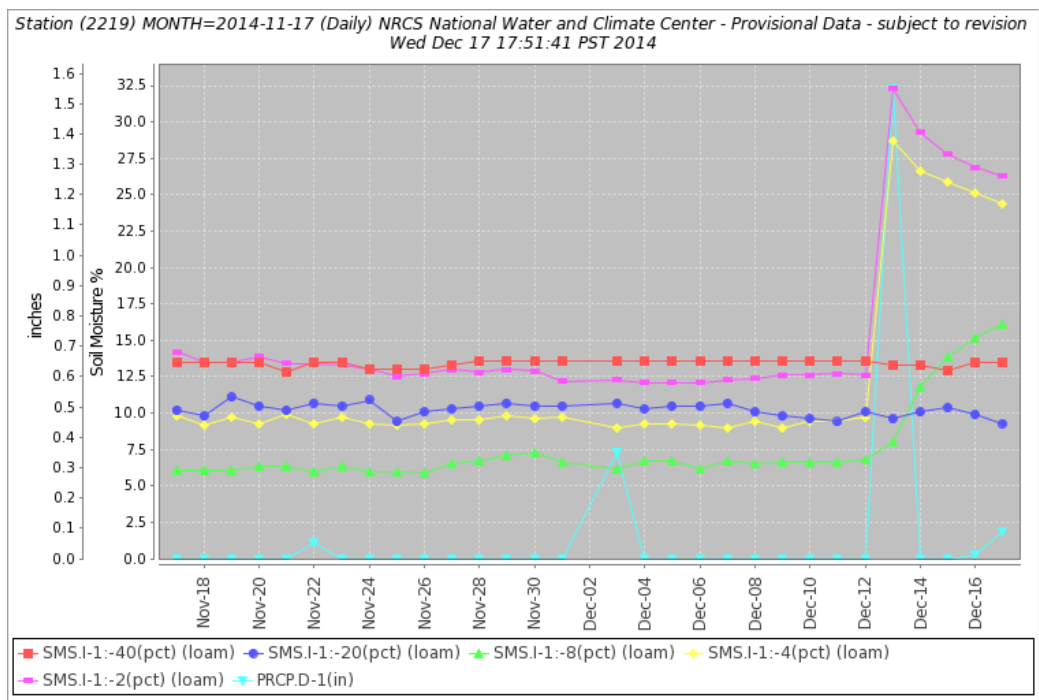
Soil Moisture



The national soil moisture model ranking in [percentile](#) as of December 16, 2014, shows dryness over most of the Southwest and south central U.S. The driest areas are in Wyoming, Nevada, eastern New Mexico, northern Texas, Oklahoma, Louisiana, Mississippi, and Alabama. There were additional dry areas elsewhere. Moist soils dominated north central Montana, and were also found in northern California, western South Dakota, northern Michigan, northern Wisconsin, Massachusetts, and central Florida. Slightly moist soils were also scattered elsewhere throughout the country.

Useful Hydrological Links: [Crop Moisture Index](#); [Palmer Drought Severity Index](#); [Standardized Precipitation Index](#); [Surface Water Supply Index](#); [Weekly supplemental maps](#); [Minnesota Climate Working Group](#); [Experimental High Resolution Drought Trigger Tool](#); [NLDAS Drought Monitor](#); [Soil Moisture](#)

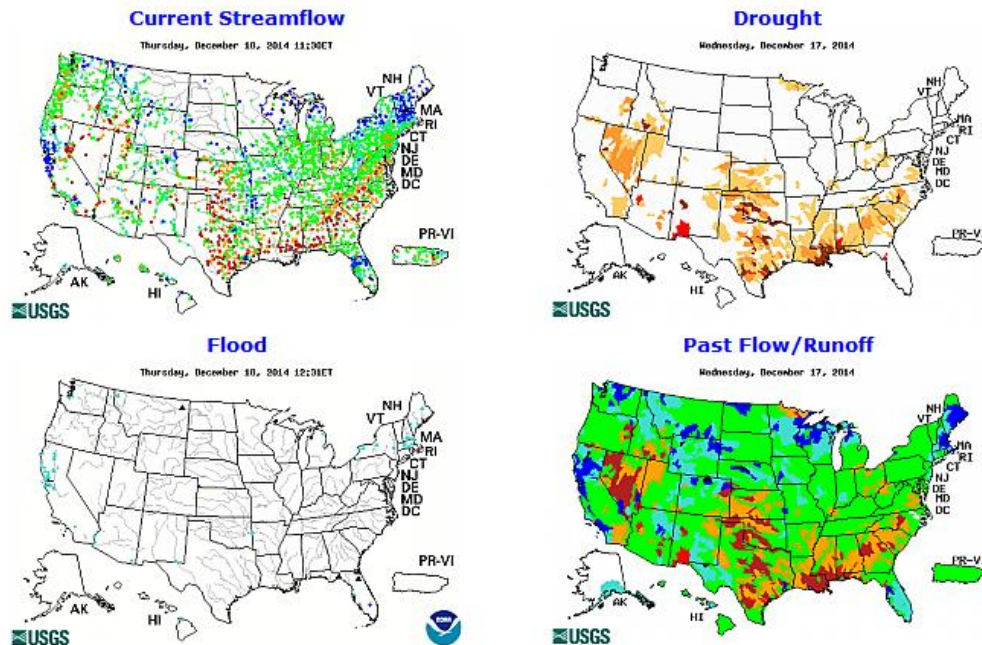
Soil Climate Analysis Network (SCAN)



This NRCS resource shows soil moisture data for the last month at the [Stubblefield SCAN site 2219](#) in southern California. The area had over 1.5 inches of precipitation on December 13 (graphed in light blue). This rainfall resulted in a sharp increase in soil moisture at the 2- and 4-inch depths, and a more gradual increase at the 8-inch depth. The deeper soil moisture sensors at 20- and 40-inch depths showed little change, due to the long term drought in the area. Useful Agriculture Links: [Vegetation Drought Response Index](#); [Evaporative Stress Index](#); [Vegetation Health Index](#); [NDVI Greenness Map](#); [GRACE-Based Surface Soil Moisture](#); [North American Soil Moisture Network](#); [Monthly Wild Fire Forecast Report](#).

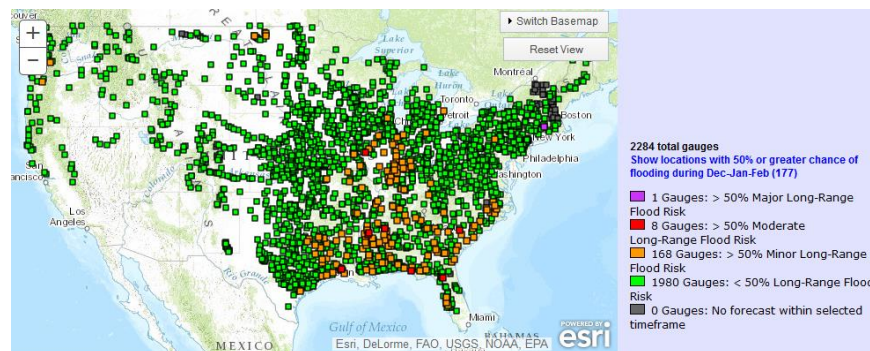
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Streamflow



Scattered gages in the U.S. are reporting above normal streamflow. The high streamflow is reported in Florida, Massachusetts, New York, New Hampshire, Vermont, Maine, northern Michigan and Wisconsin, Montana, Wyoming, Colorado, California, and Washington (left maps). Hawaii is also reporting a few rivers with high streamflow. The rivers above flood stage are the Poplar River near Poplar, MT, St. Johns River at Jacksonville, FL, St. Johns River at Buffalo Bluff near Satsuma, FL, Dunns Creek near Satsuma, FL, and the Aucilla R near Mouth near Nutall, FL.

National Long-Range Outlook



Click map to enlarge and update

Currently the Upper Midwest part of the map has not been calculated for the long range flood outlook (dark gray dots).

During the next three months, there is a risk of flooding in much of the eastern U.S. The Southeast, the Northeast, the Pacific Northwest, and northern Great Plains have gages with a slight to higher risk of flooding. Currently, **1** gage has a greater than 50% chance to experience major flooding; **8** gages for moderate flooding, and **168** gages for minor flooding.

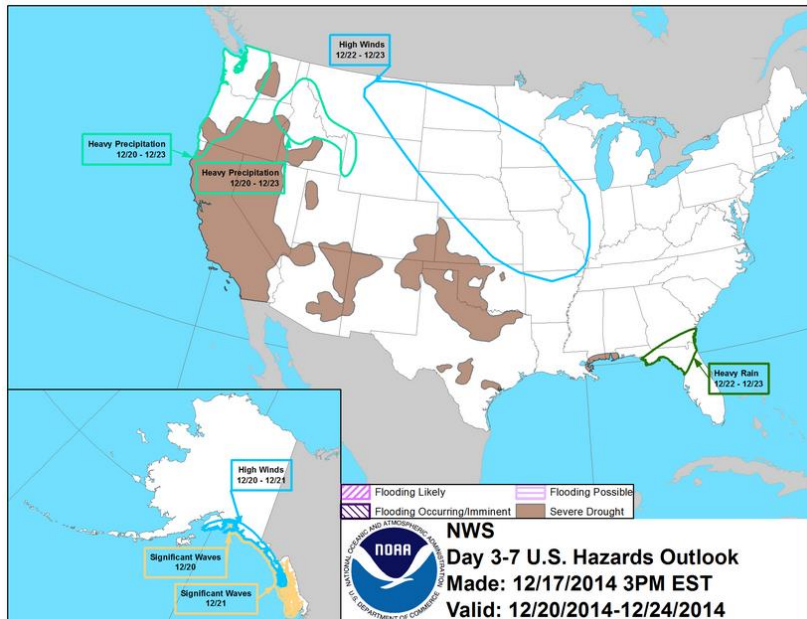
These numbers represent a 2 gage decrease in the greater than 50 percent chance of minor flooding category in the last 2 weeks.

Weekly Water and Climate Update

National [Weather Hazards](#)

Heavy precipitation is expected during the next week in Oregon, Washington, Idaho, western Montana, western Wyoming, and northwest California (12/20-23). Heavy rains are also expected in northern Florida and southern Georgia (12/22-23). High winds are expected in a large part of the Midwest (12/22-23). In Alaska, high winds are expected in the south and southeast regions, as well as significant waves in southeast Alaska.

Severe drought remains a large issue in much of the south central and western U.S.



[National Drought Summary for December 16, 2014](#)

Prepared by the Drought Monitor Author: David Miskus, NOAA/NWS/NCEP/CPC.

Summary

“Strong storm systems brought heavy, widespread precipitation to both the Northeast and West Coasts, providing beneficial moisture and drought relief to both regions. In the West, a broad trough of low pressure over the eastern North Pacific Ocean funneled several storm systems into the Pacific Coast that tapped subtropical moisture. The week’s greatest precipitation amounts fell on central and northern California where many locations totaled 4 to 12 inches. This precipitation came after the previous week’s moderate to heavy precipitation in the same area, continuing a wet pattern from northern California northward into the Pacific Northwest since mid-October. The wet weather finally allowed ample runoff (while producing stream and river flooding) that raised major reservoir levels (as of Dec. 16) in most of northern and central California by 6 to 10 percentage points from normal capacity (compared to Nov. 28 values). However, major California reservoir capacities still remained below normal, and due to above-normal temperatures accompanying these Pacific storms, more rain than snow has fallen on the lower elevations of the Sierra Nevada and Cascades, producing well below normal snow pack and water content this Water Year (since Oct. 1). Only the highest elevations have seen abundant snows. Fortunately, the West still has plenty of time this winter to build its snow pack for spring and summer stream runoff. Early in the week, a developing storm off the mid-Atlantic Coast looped back eastward, then tracked slowly northward, and eventually stalled over New England, dropping more than 1.5 inches of precipitation from eastern New York state eastward, with locally more than 4 inches in Maine. Late in the period, a storm system in the Nation’s mid-section brought widespread light to moderate precipitation to most of the Plains and Midwest, finally bringing welcome moisture to the central Plains and western Corn Belt after a very dry November and early December. Weekly temperatures averaged well above normal in the western two-thirds of the Nation and in New England, while the Southeast experienced subnormal temperatures.

Central and Southern Plains

The storm system previously mentioned in the Northern Plains and upper Midwest brought beneficial and welcome precipitation to the southern Great Plains (northeastern Texas, eastern Oklahoma) and central Plains (eastern and northern Kansas and most of Nebraska). The greatest totals (between 1.5 and 2 inches, locally to 2.7 inches) fell along the eastern Red River Valley, with 1 to 1.5 inches occurring in eastern Oklahoma, eastern and northwestern Kansas, and central and eastern Nebraska, with most locations (even Nebraska) seeing this precipitation fall as rain on unfrozen ground. With winter precipitation totals typically low, this was a significant moisture event. But due to the very dry autumn

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weather, this event was not quite enough to erase D0 over most of the central Plains; however, where November was wetter (Kansas southward) and this event had higher totals (at least an inch), a slight 1-category improvement was made. This included northwestern and eastern Kansas, southeastern Oklahoma, and northeastern Texas. In contrast, minimal or no precipitation fell on western and southern sections of Texas, and some slight deterioration was warranted in Texas in the northwestern Panhandle, along the southeastern coast near Matagorda Bay, and northeast of Houston.

Hawaii and Puerto Rico

In Hawaii, occasional light to moderate showers (daily totals generally 0.1 to 0.5 inches, locally to 3 inches) fell on the windward sides of the islands while little or no rain was measured on most leeward locations. With last week's expansion or development of D0 to the island's leeward side and adequate rainfall on the windward sides, no change in depiction was made to the state this week.

In Puerto Rico, light amounts (less than 0.5 inches) were reported on the small remaining D0(SL) area along the south-central coast. Although surplus rains fell during August and November and mitigated most of the island's dryness and drought, lingering deficits from a relatively quiet Atlantic and Caribbean tropical season still remained in central sections (north of the current area). This area will be closely monitored as continued dry weather could easily slip central Puerto Rico back into D0, although average stream flows are currently near-normal.

New England and mid-Atlantic

A developing storm off the mid-Atlantic made an unusual loop back toward the coast, and then slowly tracked northward and intensified, dropping widespread moderate to heavy precipitation (1.5 to 4.7 inches), mostly rain, on New England, especially in eastern sections. As a result, most shortages out to 90-days and even 6-months were eliminated or significantly reduced, and with USGS average stream flows (at 1-, 7-, 14-, and 28-days) in the above (76-90) or much above (>90) percentile categories in eastern sections, D0 was erased from eastern New York, Connecticut, Rhode Island, Massachusetts, and most of southern Maine and New Hampshire. The small D1 in Ulster County, NY, was also removed due to an AHPS (radar) dry bias, with ACIS (in-situ) values at 60- and 90-days near normal. With Massachusetts getting soaked, the state removed its Drought Advisory from their Southeast and Cape Cod/Islands regions. In contrast, areas to the west and south received less precipitation, so D0 remained in most of Pennsylvania, northwest New Jersey, and western New York. In contrast, short-term deficiencies (at 60- and 90-days) in northwestern upstate New York called for the development of abnormal dryness where ACIS ground-based data showed 60-day precipitation at 60-75 percent of normal, and 7-, 14-, and 28-day USGS average stream flows in the below normal (10-24 percentile) range. Elsewhere, light precipitation (less than 0.5 inches) and near to below normal temperatures were enough to maintain conditions in the mid-Atlantic.

Northern Plains and upper Midwest

After a rather dry November and early December, a storm system developed over the Southwest and intensified over the south-central Plains while tracking northeastward, bringing welcome moisture not only to the southern and central Plains, but also to parts of eastern South Dakota, Iowa, and much of Minnesota. The precipitation (0.25 to 0.75 inches, locally to 1.2 inches) was enough to stave off any deterioration in the region, and was a nice moisture bonus where the soils were not frozen (and since December normals are quite low). In the western Dakotas where little or no precipitation fell, short and medium-term surpluses existed, so dryness was not a factor. Accordingly, status-quo was applied here.

Southeast

Subnormal precipitation has persisted across the southern and western sections of the Southeast (especially the central Gulf Coast region) while near to above normal totals have fallen on most areas to the north and east during the past several months. With such low amounts the past 30-days (0.5 to 2 inches), 60-days (1 to 4 inches), and 90-days (2 to 8 inches), and relatively large precipitation normals, short-term deficits have quickly accumulated the past 3 months. The greatest deficiencies were concentrated along the central Gulf Coast (southern sections of Louisiana, Mississippi, Alabama, extreme western Florida Panhandle) where 2-4, 4-8, and 6-12 inch deficits were found at 30-, 60-, and 90-days, respectively. Just to the north, short-term deficits have also accumulated, but not to such the large extent. In addition, USGS average stream flows at instantaneous, 1-, 7-, and 14-days are depicting percentiles in the lower tenth (much below normal), with a few record low values. Accordingly, D2 was expanded along the central Gulf Coast, D1 increased into south-central Louisiana, south-central Mississippi, extreme

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western Florida Panhandle, and a bit in east-central Georgia, and D0 pushed northward into northern Louisiana, central Mississippi, and central Georgia, and added to southwestern North Carolina. D0 and a bit of D1 was removed from north-central Florida northeastward into south-central Georgia as 5-10 inches of rain the past 30 days was enough to warrant its removal even out to 90-days. Little or no rain fell on Florida and along the southern Atlantic Coast, but that area had been wet in the short-term, so no D0 was added.

Southwest

With most of this week's significant precipitation concentrated in the Far West (e.g. California), only light amounts (0.1 to 0.5 inches, locally to 1.2 inches) fell on most of the Four-Corners States. Toward the east, little or no precipitation was reported in eastern New Mexico and western Texas. After the previous week's light to moderate totals in Arizona and northwestern New Mexico, and a rather robust and long-lasting Southwest monsoon, surplus precipitation still lingered at 90- and 180-days across much of the region, thus no deterioration was needed. This is fortunate as the WYTD (since Oct. 1) basin average precipitation and SWE are both below normal, ranging from 50-70 percent of normal (precipitation) and 10-80 percent of normal (Dec. 15 SWE), with conditions closer to normal in central Colorado and northeastern New Mexico.

Tennessee and lower Mississippi Valleys

Similar to the Southeast (but not quite to its extent), mostly light precipitation (0.5 inches or less) fell on parts of the western Tennessee and lower Mississippi Valleys, also continuing a short-term pattern of subnormal precipitation out to 90-days. Shortages accumulated at 30-, 60-, and 90-days from central Arkansas northeastward into western Kentucky were 2-4, 4-6, and 4-8 inches, respectively, as normals are a bit lower as compared to locations farther to the south. In contrast, enough rain (about 1.5 inches) fell on northwestern Louisiana from the south-central Plains storm system, and along with prior November rains, D0 was removed. However, as mentioned in the Southeast summary, drier weather over the rest of the state was enough to expand D0 across the rest of north Louisiana.

The West

Two consecutive weeks of widespread heavy (7-day totals of 4 to 12 inches) precipitation, augmented by above-normal autumn precipitation, produced major stream and river flooding in north-central California. The flooding on the Sacramento River was the highest since Dec. 31, 2005. The runoff led to good capacity increases (6 to 10 percentage points) in major reservoirs across northern and central California; however, they were still below the historical averages for Dec. 16. For example, the Nov. 28 Trinity, Shasta, Oroville, Folsom, and San Luis Lakes percent of capacity was 23, 23, 26, 28, and 23; on Dec. 16, they increased to 29, 32, 33, 38, and 33 percent, respectively, but the Dec. 16 historical averages were 44, 53, 54, 79, and 52 percent. Based upon historical storage data, almost every major reservoir saw a 1-category drought improvement in their levels during the first half of December, and combined with wet start to the Water Year (and December), a broad 1-category improvement was made in north-central and along the central coast of California (D4 to D3, or 0-2 to 2-5 percentile). In addition, the mountains east of San Diego and south of San Bernardino in southern California received between 6-12 inches of December precipitation, improving overall moisture conditions there from D3 to D2 levels. Lastly, along the border of California and Arizona, a reassessment of conditions noted surpluses at 30- and 180-days, hence D0 was extended northward to the tip of southern Nevada.

Unfortunately, remaining areas to the south and east of the 1-category improvements were unchanged as the storms precipitation amounts were lower (but welcome), the autumn months were quite dry, runoff was minor to non-existent (albeit a few mudslides in fire-scarred slopes), and not surprisingly, the major reservoir levels in the south remained static. Furthermore, the rain shadow effect was notable on the Nevada side where much less moisture made it over the Sierra Nevada Mountains. Also, temperatures accompanying the storms have been above-normal, leading to more rain than snow at the higher elevations (e.g. Sierra Nevada). As a result, the snow water equivalents (SWE) for the northern, central, and southern Sierras were only at 43, 43, and 63 percent of normal for Dec. 16, which was actually higher than SWE values farther north in the Cascades of Oregon and Washington (10-30 percent). Fortunately, there are still many months left in their normal wet season for the Far West to build-up their snow pack, even though the Water Year-to-Date (WYTD) precipitation was at or slightly above normal in the Pacific Northwest. In north-central Washington, the past few months have been wet enough to justify a 1-category improvement to D1 as WYTD basin average precipitation was 112 to 120 percent. Similarly, surplus precipitation has fallen on extreme northern Idaho during the past 6-months to justify removal of D0.

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Elsewhere across the West and Rockies, enough precipitation (0.2 to 1 inch) fell from these Pacific storms to prevent any further deterioration, but not enough to warrant improvement.

In summary, a wet December (to date) has provided California a foothold for drought recovery, but 3 straight winters of subnormal precipitation will take time (possibly several consecutive wet winters) to fully recharge the reservoir levels and subsoil moisture back to normal. With several more months still left in the wet season, it is possible that additional storms similar to the ones that just occurred will continue to chip away at the long-term hydrological drought, and the addition of lower temperatures would help build the snow pack. "Cautious optimism, but still a long way to go" would be the very short summary for this week's California drought picture.

Looking Ahead

For the upcoming 5-day period (December 18-22), heavy precipitation (up to 10 inches in northwest Oregon) is forecast for the Pacific Northwest (and southward to northwestern California) and northern Rockies, with lighter amounts in the central Rockies. A southern storm system should bring widespread moderate to heavy precipitation (1 to 4 inches) from central Texas eastward to Georgia and the Carolinas (including the expanding drought area in the Southeast), and lighter amounts along the Northeast Coast and in the central Great Plains. Mostly dry weather is expected in the Southwest (including southern California), High Plains, upper Midwest, Ohio Valley, and southern Florida. Near to above normal temperatures should envelop most of the lower 48 States, with the greatest positive departures in the northern Rockies and Plains and upper Midwest.

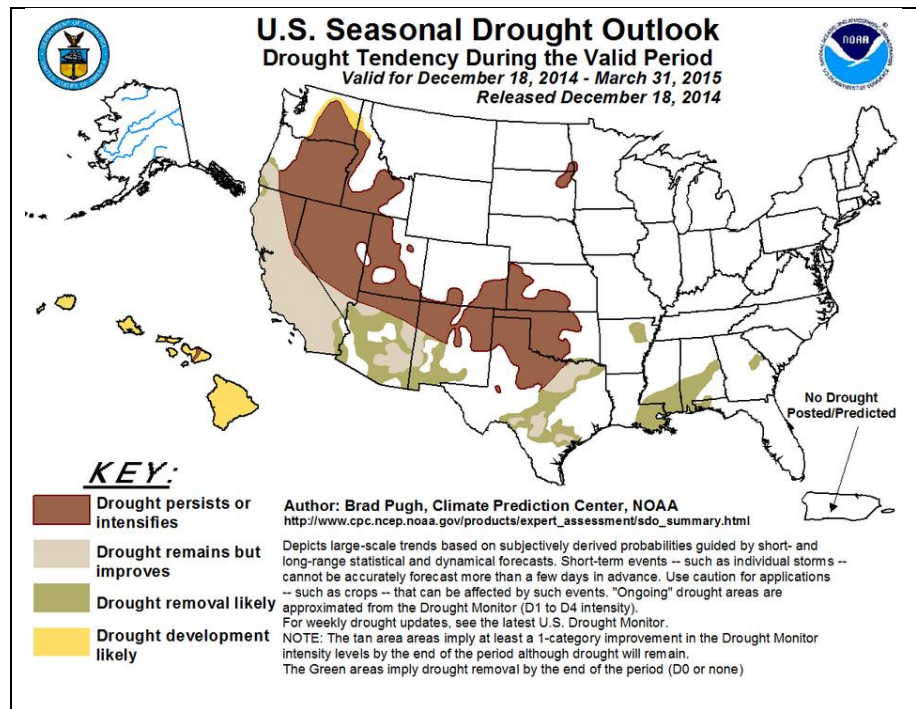
For the ensuing 5-day period (December 23-27), the CPC 6-10 day outlooks tilt the odds toward subnormal precipitation for eastern and southeastern Alaska, and from southern Oregon and California southeastward into the lower Mississippi Valley (lower Delta). Favorable chances of above median precipitation are expected in western Alaska, across the northern tier of States, and in the eastern quarter of the Nation, with the highest odds in the Great Lakes region and Northeast. Above median temperatures are expected in Alaska, the Far West, Southwest, and New England, with subnormal readings favored in the northern Plains and Florida."

Supplemental Drought Information

National Seasonal Drought Outlook

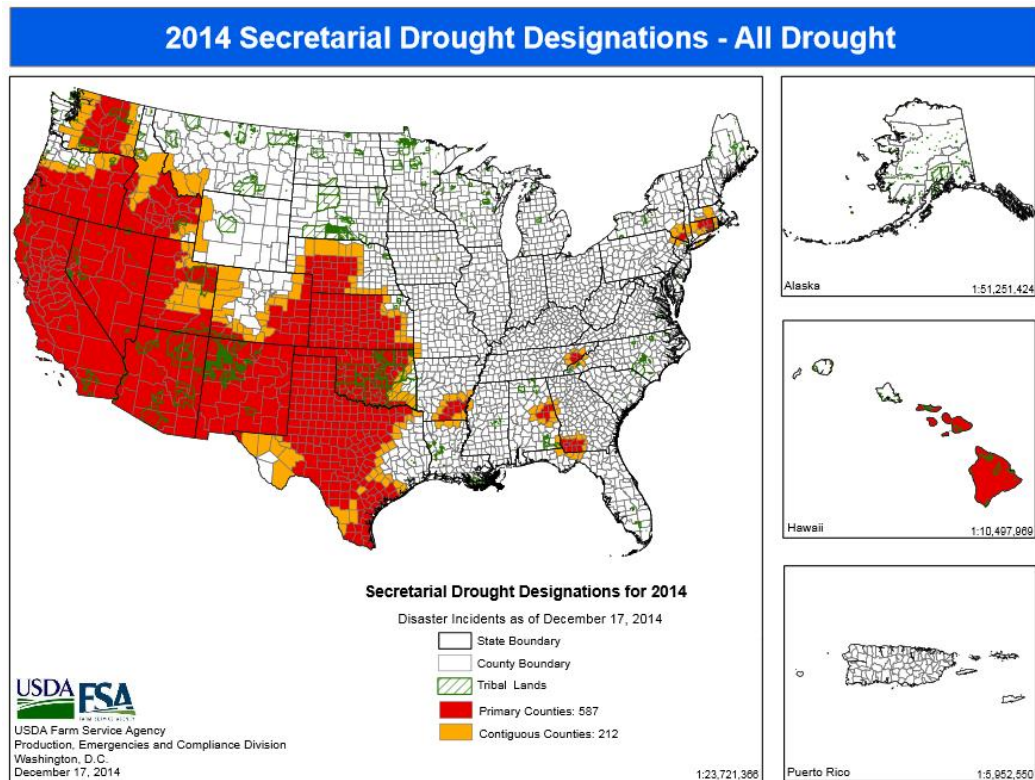
Nationally, [drought](#) is expected to persist or intensify over much of the West and south central U.S., including Nevada, Oregon, Washington, Idaho, Utah, Arizona, New Mexico, Texas, Oklahoma, Nebraska, and Colorado. Improvements are expected in California and in parts of the Southwest and Texas. Some areas of drought are likely to develop in Washington.

Also see: [National Significant Wildland Fire Potential Outlook](#) (updated on the first of each month) contains a content summary of the previous month's conditions.



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2014 USDA Secretarial Drought Designations

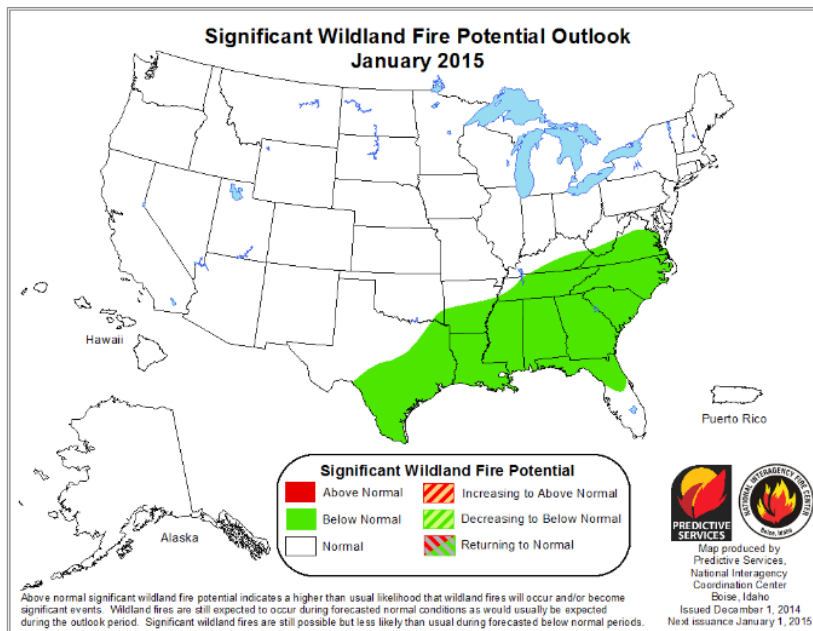


Refer to the USDA Drought Assistance [website](#) and [National Sustainable Agriculture Information Service](#).

Read about the new [USDA Regional Climate Hubs](#).

New useful resource: [NASS Quick Stats](#)

National Fire Potential Outlook



January Fire Forecast

In January, much of the U.S. has normal [fire potential](#).

The below normal fire potential area in green on the map is forecast for Texas, through the Southeast, to the mid-Atlantic states.

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Additional Maps

U.S. Maps PowerPoint presentation: <http://dmcommunity.unl.edu/maps/US-Maps.ppt>.

Regional zooms of ACIS station data percent-of-normal precipitation:
<http://dmcommunity.unl.edu/maps/All-CONUS-ACIS-PNP.pptx>.

National Water and Climate Center (NWCC) Surface Water Supply Index (SWSI) maps:
<http://www.wcc.nrcs.usda.gov/wsf/swsi.html>

Supplemental Drought-Agriculture News

Download [archived](#) "U.S. Crops in Drought" files.

This is a collection of drought-related news stories from the past seven days or so from this past week. Past Impact information from these articles is entered into the [Drought Impact Reporter](#). A number of these articles are posted on the [Drought Headlines](#) page at the NDMC website. The list is compiled by Denise D. Gutzmer, Drought Impact Specialist, and National Drought Mitigation Center.

"Much of the news this week revolved around storms pushing through California, bringing desperately needed rain and relief to a parched state.

California drought not due to climate change

California's drought stemmed from natural weather patterns, according to research from Columbia University's Lamont Doherty Earth Observatory. Some climate scientists were dissatisfied with the report because it did not include the influence of record heat on the drought.

California almond growers contribute significantly to state's GDP

California almond growers face criticism for the water used to grow their crop, especially during this epic drought, but a report by the Almond Board of California defended the industry, declaring that it offers about \$11 billion annually to the state's gross domestic product. A study conducted by the Agricultural Issues Center at UC Davis found that almond-related activities create 104,000 jobs, mainly in the San Joaquin and Sacramento valleys.

Dip in California's ag exports

California's agricultural exports were 5.9 percent lower from August through October, compared to the same time frame in 2013, according to Beacon Economics. Drought was the main reason for the reduction.

\$40 million addition to SoCal water conservation fund

The Metropolitan Water District's board of directors supplemented its conservation budget by \$40 million and updated its water allocation plan as drought continued. The increased funding boosted the rebate budget from \$60 million to \$100 million. The public response to the rebate program has been phenomenal with more than \$100 million in turf removal requests from July through November 2014.

Drought a danger to Sierra Nevada animals

Numerous deer, bears and other large animals in the Sierra Nevada have been struck in greater numbers this year because drought and wildfires have driven them to seek areas with better food and water resources. Caltrans and the California Department of Fish and Wildlife issued a public warning, urging drivers to be cautious and on the lookout for wildlife along roadways.

Water jealousy in Colorado River basin

The director of the Colorado Water Conservation Board announced that his state would not be sacrificing its water allotment to aid parched California, which was running low on water. Water managers from other states in the Colorado River basin shared that sentiment.

Lake Mead tunnel completed

The 3-mile tunnel 600 feet beneath Lake Mead was completed on Dec. 10 after nearly seven years of work. The project reaches the third intake structure, which will allow Las Vegas to draw water from an even lower part of the lake if the water level continues to fall.

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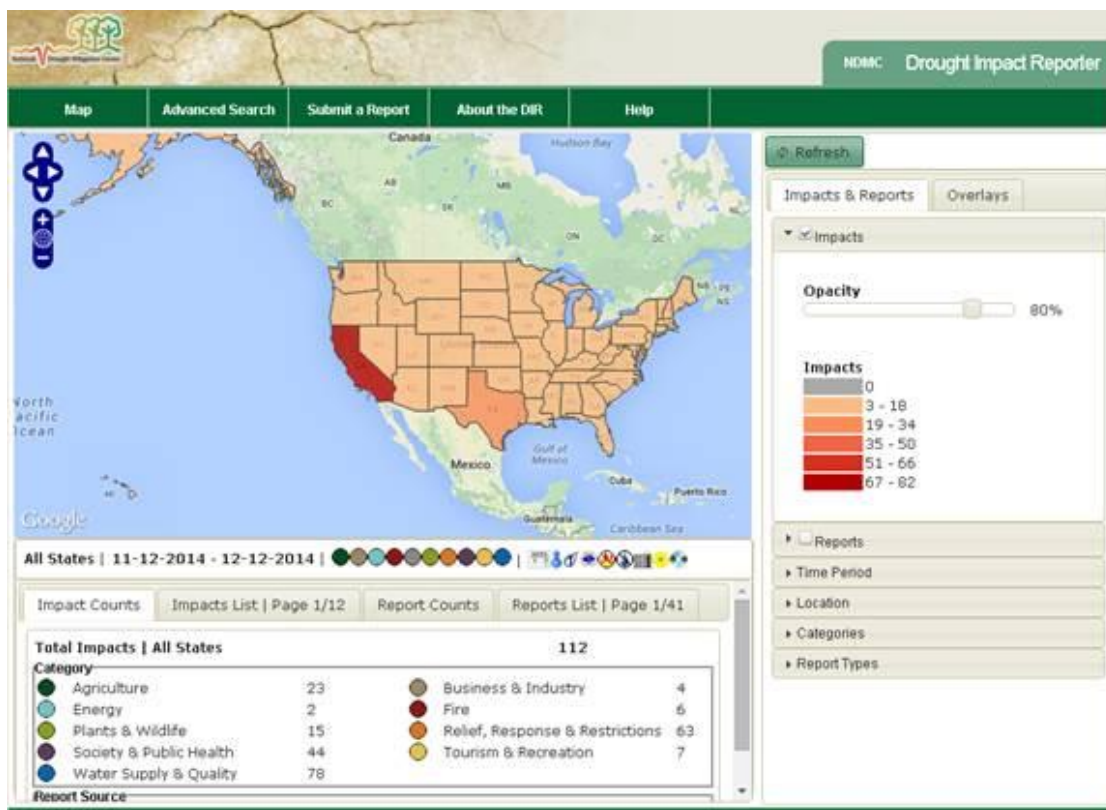
The Southern Nevada Water Authority proposed a plan to build a new \$650 million pumping station to keep water flowing into the valley in the event that Lake Mead dips below 1,000 feet.

Water shortage, crop loss in southeastern Oregon

Three consecutive years of drought and meager snowfall in Eastern Oregon have cost farmers tens of millions in lost or unplanted crops. Water supplies for 2015 were not looking very good because the project usually carries over 350,000 to 500,000 acre-feet of available storage, but only had 30,000 acre-feet to carry over this year.

Water supplies dangerously low in Texas

The Palo Pinto Municipal Water District No. 1 plans to construct a \$6 million reverse osmosis plant and secure water rights for the next three years from a rights holder on the Brazos River. Lake Palo Pinto is the main water source for Mineral Wells and held just 10 percent of capacity. The lake is expected to be dry in the spring of 2015 without additional inflows. The neighboring towns of Gordon and Mingus may be out of water by mid-February.”



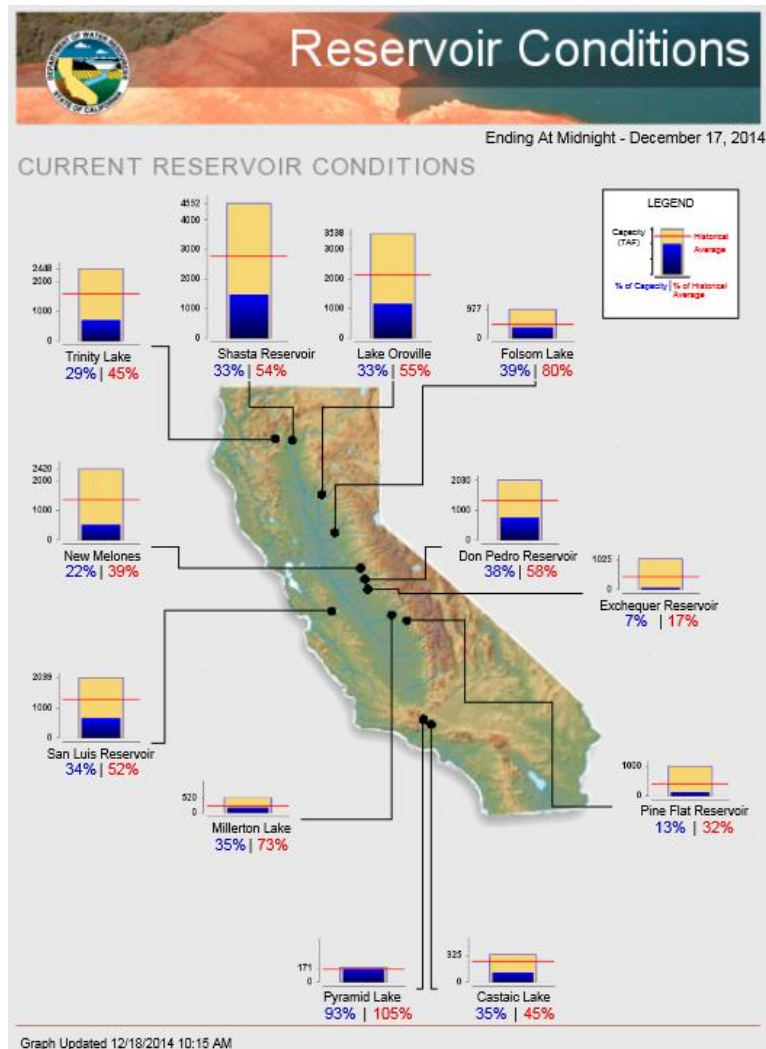
Tea Cup Reservoir Depictions

- <http://www.usbr.gov/uc/water/basin/> ← Upper Colorado
- http://www.usbr.gov/uc/wcao/water/basin/tc_gr.html; ← Upper Snake
- <http://www.usbr.gov/pn/hydromet/burtea.html> ← Upper Colorado
- http://www.usbr.gov/uc/water/basin/tc_cr.html ← Upper Colorado
- <http://www.usbr.gov/pn/hydromet/select.html> ← Pacific Northwest
- <http://www.sevierriver.org/reservoirs/teacup-diagram-of-reservoirs/> ← Sevier River Water (UT)

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California Reservoir Conditions

[California Major Reservoir conditions from the CA Department of Water Resources](#)



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Special California Drought Update through Dec. 16 from USDA:

Dec 18, 2014

By Brad Rippey, Meteorologist, Office of the Chief Economist, U.S. Department of Agriculture

“PLEASE NOTE: This update is specific to California due to significant precipitation that has fallen since Thanksgiving.

Since Thanksgiving, several systems have brought significant precipitation across California. In valley locations, rain has boosted topsoil moisture, benefited winter grains, and helped to revive rangeland and pastures. According to the U.S. Department of Agriculture’s National Agricultural Statistics Service, 30 percent of California’s rangeland and pastures were rated in good to excellent condition on Dec. 14, compared to just 15 percent on Oct. 26. Also on Dec. 14, four-fifths (80 percent) of California’s winter wheat was rated in good to excellent condition.

During the three-week period from Thanksgiving Day (Nov. 27) to Dec. 17, rainfall totals at selected California locations included:

Location	Total in inches	Normal in inches	Percent of Normal
Mt. Shasta City	11.63	4.94	235
San Francisco	11.30	2.41	469
Redding	9.84	4.03	244
Sacramento	8.15	2.01	405
San Diego	4.42	0.92	480
Los Angeles	3.95	1.14	346
Fresno	2.30	0.98	235
Bakersfield	1.87	0.60	312

During California’s wet spell, most of the precipitation has been produced by “warm” storms. As a result, Sierra Nevada snow levels have been very high – sometimes above 7,000 feet. Consequently, high-elevation snowpack is neither deep nor well established. According to the California Department of Water Resources, the average water content of the high-elevation Sierra Nevada snowpack was less than 4 inches on Dec. 17 – only 48 percent of normal for this time of year. In a typical winter, nearly 30 inches of water builds up in the Sierra Nevada snowpack by April 1.

With most of the precipitation falling as rain, some of California’s major reservoirs received a boost from runoff. In general, the runoff led to capacity increases (at least 6 to 10 percentage points) in major reservoirs across northern and central California. For example, the respective percent of capacity values for Nov. 28 for Trinity, Shasta, Oroville, Folsom, and San Luis Lakes were 23, 23, 26, 28, and 23; on Dec. 16, they increased to 29, 32, 33, 38, and 33 percent. Respective historical averages on Dec. 16 for those five reservoirs are 44, 53, 54, 79, and 52 percent.

The latest U.S. Drought Monitor, issued Dec. 18, indicates that there was a substantial reduction in D4 (exceptional drought) coverage in northern and central California. Statewide, D4 coverage fell from 55 to 32 percent -- the smallest area in exceptional drought since early June 2014. However, overall drought (D1 to D4) coverage declined only slightly in California, from 99.7 to 98.4 percent. In other words, nearly all of the state remains in drought, although the drought intensity has decreased by one category in parts of northern and central California.

California Weather Outlook: Northern and central California can expect one more round of precipitation, starting on Friday, Dec. 19. Starting this weekend, however, the focus for heavy precipitation will shift into

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the Northwest. As a result, the last ten days of December appear likely to be rather warm and dry across most of California, although showers may occasionally graze the northern part of the state.”

The next regularly scheduled issuance of the emailed U.S. drought update will be Thursday, Jan. 8, 2015, unless conditions warrant an earlier release. The “U.S. Crops in Drought” products are online:

<http://www.usda.gov/oce/weather/Drought/AgInDrought.pdf>

Archived “U.S. Crops in Drought” files:

<http://drought.unl.edu/Planning/Impacts/USAgInDroughtArchive.aspx>

Online version of this release: <http://drought.unl.edu/NewsOutreach/NDMCNews.aspx?id=181>

State Activities

[State government drought activities](#) can be tracked through their drought plans. NRCS Snow Survey and Water Supply Forecasting (SSWSF) Program State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SSWSF information. Additional information describing the [tools](#) available from the Drought Monitor can also be found at the [U.S. Drought Portal](#).

More Information

The National Water and Climate Center (NWCC) [Homepage](#) provides the latest available snowpack and water supply information. This document is available [weekly](#). CONUS Water and Climate Updates from 2007 are available online. Reports from 2001-2006 are available on request.

This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/

David W. Smith

Deputy Chief, Soil Science and Resource Assessment